

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 4161-250PCT	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/CA2004/001442	International filing date (day/month/year) 02 August 2004 (02-08-2004)	Priority date (day/month/year) 01 August 2003 (01-08-2003)
International Patent Classification (IPC) or national classification and IPC IPC(7): B27K 5/04, B27K 3/15, B27K 3/52		
Applicant HYDRO QUEBEC ET AL		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>7</u> sheets, as follows:</p> <p style="padding-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="padding-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. 1 and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 28 February 2005 (28-02-2005)	Date of completion of this report 2 December 2005 (02-12-2005)	
Name and mailing address of the IPEA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476	Authorized officer Michael M. Morgovsky (819) 953-0765	

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2004/001442**Box No. I Basis of the report**

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
- | | |
|---|---|
| <input checked="" type="checkbox"/> pages <u>4-18</u> | as originally filed/furnished |
| <input checked="" type="checkbox"/> pages* <u>1-3</u> | received by this Authority on <u>August 1, 2005</u> |
| <input type="checkbox"/> pages* | received by this Authority on _____ |
- ☒ the claims:
- | | |
|---|---|
| <input type="checkbox"/> pages | as originally filed/furnished |
| <input type="checkbox"/> pages* | as amended (together with any statement) under Article 19 |
| <input checked="" type="checkbox"/> pages* <u>19-22</u> | received by this Authority on <u>August 1, 2005</u> |
| <input type="checkbox"/> pages* | received by this Authority on _____ |
- ☐ the drawings:
- | | |
|---------------------------------|-------------------------------------|
| <input type="checkbox"/> pages | as originally filed/furnished |
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| <input type="checkbox"/> pages* | received by this Authority on _____ |
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages 1-3
- ☒ the claims, Nos. 8, 9, 24
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2004/001442

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	:	YES
	Claims	<u>1-21</u>	NO
Inventive step (IS)	Claims	:	YES
	Claims	<u>1-21</u>	NO
Industrial applicability (IA)	Claims	1-21	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement

D1 US 6064883 (BESNER A et al.) May 16, 2000

The arguments contained in the applicant's response to the Written Opinion dated August 1, 2005 are not regarded as convincing. The following comments are offered to support examiner's position with respect to novelty of claims 1-20.

- Applicant is correct in that D1 requires the presence of a polymerization initiator to polymerize a prepolymer as defined (col.4, lines 6-12). Specific polymerization initiators are disclosed in column 6 (lines 37-47) and are present in every example provided to illustrate the invention. It is noted, however, that claim 1 uses an open transition phrase, such as "comprising" when reciting steps b3) or bb1) of the inventive process. Use of "comprising" allows the presence of other components within the solution in addition to polymerizable reactive groups having a reactive double bond, as presently stated. These components may also include polymeric initiators, which may be either identical or similar to those defined in D1. At present language of claim 1 does not specifically exclude the presence of a polymeric initiator within either the process sequence b1) to b4) or bb1) to bb2). Since claims of the present application include a polymeric initiator in an impregnating solution utilized in either step b3) or step bb1) of the mentioned process sequences, content of D1, which is considered to represent the closest prior art document, is still found relevant to novelty of claims 1-20.

Hence, the objection raised in paragraph 1.1 of the Written Opinion still remains outstanding. Article 33(2), PCT.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

5. Although applicant restricted vague terminology identified in paragraph 5 of the Written Opinion, examiner still believes that the amended expressions include either water-borne wood preservatives or polymerizable reactive groups having a double bond which may represent inoperable embodiments of the invention. Since the mentioned expressions are so vague and imprecise, it is impossible to establish the scope of protection for an inventive subject matter. Applicant is invited to adequately define the expressions in question to satisfy the requirements of Article 6 of the PCT. Pertinent subject matter is discussed on page 4 of the description.
6. Term "up to" of claim 4 causes ambiguity because it is not clear whether "up to" is intended to include at least some or also includes none. Applicant should specify at least some amount of a wood preservative at the lower end of the stated range to address the objection raised in paragraph 6.2 in order to satisfy the provisions of Article 6 of the PCT.
7. Although description clearly indicates that difference between an inventive method and the state of the art resides in that the polymerization in the inventive process sequences is carried out without a polymeric initiator (page 1, lines 20-22; page 5, lines 20 and 21; page 11, starting at line 19), claim 1 of the present application fails to reflect that. Noted inconsistency, which was previously raised in paragraph 7 should be avoided to satisfy the provisions of Article 5 of the PCT.
8. Claim 1 is unclear and does not comply with Article 6, PCT. The claim does not clearly and concisely define an inventive solution in terms of its constituent elements and their relative amounts.
9. Claim 6 is unclear and does not comply with provisions of Article 6 of the PCT. The expression "the cooling step" lack a proper antecedent basis.
10. Feature of claim 10 has already been recited in claim 1. Applicant should remove the claim in question and renumber subsequent claims accordingly to meet the provisions as stipulated in Article 6, PCT.
11. It appears that moisture content of wooden elements should be reduced to a level of 15-35% before advantages of the inventive process, as claimed, are obtained. This feature should be present in claim 1 to satisfy the requirements of Article 6 of the PCT.
12. The description does not comply with Article 5, PCT. A statement in an application, such as found on page 1 (line 16), which refers to an unpublished document, should not be regarded as being part of the description.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

- 1.1 Claims 1-20 also appear to be obvious in view of D1 and, accordingly, fail to satisfy the requirements of Article 33 (3) of the PCT.
- 1.2 Claim 21 relates to wooden elements obtained in accordance with process as defined in claims 1-20. Since presence of a polymeric initiator in the impregnating solution of independent claim 1 and its dependent claims 2-20 is not excluded, wooden elements treated in accordance with teachings of D1 and the present application are considered to be identical.

Hence, subject matter of D1 is prejudicial to novelty of the claim in question. Article 33(2) of the PCT.
2. Claim 1 is considered to be obvious to a person skilled in the art in view of the teachings of D1. Although the Prior Art document utilizes a polymerization initiator for cross linking reaction, it is clear that cross linking may be accomplished by means other than the use of polymerization initiator. Therefore, it would be obvious to one of ordinary skill to perform cross-linking without an initiator.

Hence, claim 1 does not involve inventive step contrary to Article 33(3) of the PCT.
- 2.1 Features of claims 2-21, which appear to be directed either to normal design options or come within routine-like developments, applications or process optimization, are also considered as being obvious in view of D1.

Hence, claims 2-21 do not appear to involve an inventive step as required by the provisions of Article 33(3) of the PCT.
3. In view of applicant's amendment with respect to the further definition of the "polymerizable reactive group" requiring presence of a reactive double bond, D2 becomes irrelevant and, accordingly can not be combined with teachings of D3 and either D4 or D5 to maintain the objection regarding an inventive step.

Hence, the objection raised in paragraphs 2 to 2.4 with respect to obviousness of claims 1-3 is withdrawn. Therefore, the provisions as stipulated in Article 33(3) of the PCT are satisfied.
4. Subject matter of claims 1-21 is considered to be industrially applicable and thus fulfilling the requirements of Article 33(4) of the PCT.

PROCESS FOR TREATING ELEMENTS MADE FROM NON-DRIED WOOD**FIELD OF THE INVENTION**

- 5 The invention relates to a process for the treatment of wooden elements. These elements are advantageously made from non-dried wood in order *inter alia* to permanently decrease their hardness. Preferably, said non-dried wooden elements may consist of poles or analogous articles made from green wood.
- 10 Another object of the present invention relates to the treated wooden elements obtained as a result of any process according to the present invention. A further object of the present invention relates to the use of said treated wooden elements in a distribution network of electricity or telecommunication, especially as outdoor supporting elements for transformers, wires, etc.

15 DESCRIPTION OF PRIOR ART

US patent application serial number 10/258,612 describes a wood treatment, in the presence of an oxidizing agent, resulting in a permanent reduction of the hardness of the wood.

- 20 However, none of the prior art processes for treating wood avoid to engage chemical auxiliary products and allow to produce treated wooden elements exhibiting *inter alia* a hardness that is permanently reduced.

SUMMARY OF THE INVENTION

- 25 Advantageously, the present invention relates to a process for the treatment of wooden elements, said process comprising the following steps:

- a) conditioning said wooden elements to reduce their moisture content; and
 - b) performing one of the following sequences of steps selected from the group
- 30 consisting of at least the sequence of steps b1) to b4) or at least the sequence of steps bb1) to bb2);

said sequence of steps b1) to b4) at least comprising:

b1) impregnating the wooden elements obtained from step a) with at least one water-borne wood preservative,

b2) heating the wooden elements obtained from step b1) at a temperature of at least 51° C to fix said wood preservative(s) in said wooden elements,

b3) impregnating the wooden elements obtained from step b2) with a solution comprising polymerizable reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and

b4) subjecting the wooden elements obtained from step b3) to polymerizing condition to polymerize said reactive group(s);

said sequence of steps bb1) to bb2) at least comprising:

bb1) impregnating the wooden elements obtained from step a) with a mixture of at least one water-borne wood preservative and polymerizable reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and

bb2) heating the wooden elements obtained from step bb1) at a temperature of at least 51°C to fix said wood preservative(s) and to polymerize said reactive groups.

According to a preferred aspect, the invention relates to a process characterized in that it comprises the following steps:

a) conditioning said wooden elements to reduce their moisture content; and

b1) impregnating the wooden elements obtained from step a) with at least one water-borne wood preservative,

b2) heating the wooden elements obtained from step b1) at a temperature of at least 51° C to fix said wood preservative(s) in said wooden elements;

b3) impregnating the wooden elements obtained from step b2) with a mixture comprising wood preservative and polymerizable reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and

5 b4) subjecting the wooden elements obtained from step b3) to polymerizing condition to polymerize said reactive group(s).

Preferably, a further step may be comprised between steps b2) and b3). This further step is a cooling step of the wooden elements obtained from step b2). Advantageously, said cooling step may be carried out until said wooden elements reach a temperature of 30°C or less in the outer 25
10 mm of said wood elements. Preferably, the cooling step may be carried out for at least 1 to 12 hours.

According to another preferred aspect, the invention relates to a process characterized in that it comprises the following steps:

a) conditioning said wooden elements to reduce their moisture content;

15 bb1) impregnating the wooden elements obtained from step a) with a mixture comprising at least one wood preservative and polymerizable reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and

20 bb2) heating the wooden elements obtained from step bb1) at a temperature of at least 51°C to fix said wood preservative(s) and to polymerize said reactive groups.

Preferably, before step a), wooden elements may have a moisture content above the fiber saturation point, advantageously a moisture content higher than 30% and preferably a moisture content comprised between 50 and 130%. Wooden elements may consist of green wood elements.

25 Advantageously, a further step may be provided after step b4) or bb2). Preferably, said further step is a drying step of the wooden elements obtained from step b4) or bb2). More preferably, said drying step may be of the type selected from the group consisting of kiln drying, air drying and air seasoning. This optional step is advantageously provided only when it is required to adjust the moisture content of wooden elements to meet with specific requirements of some
30 applications or clients.

WHAT IS CLAIMED IS:

1. Process for the treatment of wooden elements, said process comprising the following steps:

- 5 a) conditioning said wooden elements to reduce their moisture content; and
- b) performing one of the following sequences of steps selected from the group consisting of at least the sequence of steps b1) to b4) or at least the sequence of steps bb1) to bb2);

 said sequence of steps b1) to b4) at least comprising:

- 10 b1) impregnating the wooden elements obtained from step a) with at least one water-borne wood preservative,
- b2) heating the wooden elements obtained from step b1) at a temperature of at least 51° C, to fix said wood preservative(s) in said wooden elements;
- 15 b3) impregnating the wooden elements obtained from step b2) with a solution comprising polymerizable reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and
- 20 b4) subjecting the wooden elements obtained from step b3) to polymerizing condition to polymerize said reactive group(s);

 said sequence of steps bb1) to bb2) at least comprising:

- 25 bb1) impregnating the wooden elements obtained from step a) with a mixture comprising at least one water-borne wood preservative and polymerizable reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and
- bb2) heating the wooden elements obtained from step bb1) at a temperature of at least 51°C to fix said wood preservative(s) and to polymerize said reactive groups.

2. Process according to claim 1, characterized in that it comprises the following steps:

a) conditioning said wooden elements to reduce their moisture content; and

b1) impregnating the wooden elements obtained from step a) with at least one water-borne wood preservative,

b2) heating the wooden elements obtained from step b1) at a temperature of at least 51° C, to fix said wood preservative(s) in said wooden elements,

b3) impregnating the wooden elements obtained from step b2) with a polymerizing solution comprising reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and at least one water-borne wood preservative, identical or different than the one of step b1)

b4) subjecting the wooden elements obtained from step b3) to polymerizing condition to polymerize said reactive group(s).

3. Process according to claim 1, characterized in that it comprises the following steps:

bb1) impregnating the wooden elements obtained from step a) with a mixture comprising at least one water-borne wood preservative and polymerizable reactive groups having a reactive double bond, identical or different, that will form a polymer under polymerizing condition, and

bb2) heating the wooden elements obtained from step bb1) at a temperature of at least 51°C to fix said wood preservative(s) and to polymerize said reactive groups.

4. Process according to claim 2, wherein the impregnation step b1) is carried out with a solution containing a wood preservative in an amount up to 2.5% in weight.

5. Process according to claims 2 or 4, wherein the impregnation step b3) is carried out with a solution containing 5 to 12% in weight of polymerizable reactive groups having a reactive double bond or issued from a compound having a reactive double bond.

6. Process according to claim 5, wherein the solution of step b3) further comprises from 0.04 to 0.12% in weight of the wood preservative of step b1).

7. Process according to claim 3, wherein the impregnation step bb1) is carried out with a solution comprising from 2 to 5% in weight of polymerizable reactive groups having a reactive double bond or issued from a compound having a reactive double bond, from 2.0 to 2.6 % in weight of wood preservative.
- 5 8. Process according to claim 2 or 4, characterized in that the cooling step is carried out for a period of at least 1 to 12 hours.
9. Process according to any of claims 1 to 8, characterized in that it further comprises after step b4) or bb2), a drying steps of the wooden elements obtained from steps b4) or bb2).
10. Process according to any of claims 1 to 9, characterized in that the wood preservative is a
10 water-borne wood preservative.
11. Process according to claim 10, characterized in that the water-borne wood preservative is selected from the group consisting of Ammoniacal Copper Quat., copper azole, Ammoniacal Copper Arsenate and Chromated Copper Arsenate.
12. Process according to any of claims 1 to 4, 6 and 8 to 11 characterized in that said reactive
15 groups of the polymerizable solution have a reactive double bond or are issued from a compound having a reactive double bond.
13. Process according to claims 5, 7 or 8, characterized in that reactive groups are selected from the group consisting of allyl group, vinyl group, acrylate group, methacrylate group and polymers comprising at least one group selected from the group consisting of allyl group, vinyl
20 group, acrylate group and methacrylate group.
14. Process according to claim 13, characterized in that said reactive groups are polyethylene glycol diacrylate or polyethylene glycol dimethacrylate.
15. Process according to claim 14, characterized in that said reactive groups are polyethylene glycol diacrylate or polyethylene glycol dimethacrylate, having a molecular weight comprised
25 between 600 and 10000 daltons.
16. Process according to any of claims 1 to 15, characterized in that the moisture content of the wooden element obtained from step a) is comprised between 15 and 35%.
17. Process according to claim 16, characterized in that the moisture content of the wooden element obtained from step a) is comprised between 24 and 26%.

18. Process according to any of claims 1 to 17, characterized in that the drying step a) is selected from the group consisting of kiln drying, air drying and air seasoning.
19. Process according to any of claims 1 to 18, characterized in that the amount of wood preservative impregnated in the wooden elements is superior or equal to 9.6 kg/m^3 , according to a standardized assay zone for analytical purposes as defined in CSA-O80 and AWP C-4 standards.
20. Process according to any of claims 1 to 19, characterized in that the amount of polymerizable reactive groups impregnated in at least 13 mm outer portion of the wooden elements is comprised between 10 and 40 kg/m^3 of wooden elements.
21. Treated wooden elements whenever obtained according to the process of any of claims 1 to 20.

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